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NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents
 United States Patent and Trademark
 Office
 Box PCT
 Washington, D.C. 20231
 ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 25 October 2000 (25.10.00)	
International application No. PCT/FI99/01054	Applicant's or agent's file reference 8M22PC
International filing date (day/month/year) 17 December 1999 (17.12.99)	Priority date (day/month/year) 11 January 1999 (11.01.99)
Applicant AHONEN, Pasi, Matti, Kalevi	

1. The designated Office is hereby notified of its election made:



in the demand filed with the International Preliminary Examining Authority on:

04 August 2000 (04.08.00)



in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer R. E. Stoffel Telephone No.: (41-22) 338.83.38
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From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

BORENIUS & CO OY AB
Kansakoulukuja 3
FI-00100 Helsinki
FINLANDE

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NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL PRELIMINARY
EXAMINATION REPORT
(PCT Rule 71.1)

Date of mailing
(day/month/year) 23.04.2001

Applicant's or agent's file reference
8M22PC

IMPORTANT NOTIFICATION

International application No.
PCT/FI99/01054

International filing date (day/month/year)
17/12/1999

Priority date (day/month/year)
11/01/1999

Applicant
TELEFONAKTIEBOLAGET LM ERICSSON (publ) et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/



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Authorized officer

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INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 8M22PC	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/FI 99/01054	International filing date (<i>day/month/year</i>) 17 December 1999	(Earliest) Priority Date (<i>day/month/year</i>) 11 January 1999
Applicant Telefonaktiebolaget LM Ericsson (publ) et al		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. ☐ Certain claims were found unsearchable (See Box I).
2. ☐ Unity of invention is lacking (See Box II).
3. ☐ The international application contains disclosure of a **nucleotide and/or amino acid sequence listing** and the international search was carried out on the basis of the sequence listing
 - ☐ filed with the international application.
 - ☐ furnished by the applicant separately from the international application,
 - ☐ but not accompanied by a statement to the effect that it did not include matter going beyond the disclosure in the international application as filed.
 - ☐ transcribed by this Authority.
4. With regard to the title, ☒ the text is approved as submitted by the applicant.
☐ the text has been established by this Authority to read as follows:
5. With regard to the abstract,
 - ☒ the text is approved as submitted by the applicant.
 - ☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.
6. The figure of the drawings to be published with the abstract is:
 Figure No. 1
 - ☒ as suggested by the applicant.
 - ☐ because the applicant failed to suggest a figure.
 - ☐ because this figure better characterizes the invention.☐ None of the figures.

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04Q 7/22, H04Q 7/38, G07F 9/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: G07F, H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0874529 A2 (CASIO COMPUTER CO., LTD.), 28 October 1998 (28.10.98), column 4, line 55 - column 7, line 12 --	1-6
A	DE 19616150 A1 (DST DEUTSCHE SYSTEM-TECHNIK GMBH), 27 November 1997 (27.11.97), column 3, line 66 - column 4, line 6, figures 1,2,3 --	1-6
P,A	EP 0948222 A2 (INTERNATIONAL BUSINESS MACHINES CORPORATION), 6 October 1999 (06.10.99), column 12, line 22 - column 13, line 53 --	1-6

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance
 "E" earlier document but published on or after the international filing date
 "I" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
 "O" document referring to an oral disclosure, use, exhibition or other means
 "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

18 May 2000

Name and mailing address of the International Searching Authority
 European Patent Office P.B. 5818 Patentlaan 2
 NL-2280 HV Rijswijk
 Tel(+31-70)340-2040, Tx 31 651 epo nl,
 Fax(+31-70)340-3016

Date of mailing of the international search report

13. 06. 2000

Authorized officer

Nabil Ayoub/cs
 Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 99/01054

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9411849 A1 (VATANEN, HARRI, TAPANI), 26 May 1994 (26.05.94), see whole document -- -----	1-6

INTERNATIONAL SEARCH REPORT

Information on patent family members

63193

International application No.

02/12/99

PCT/FI 99/01054

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0874529 A2	28/10/98	CN 1197343 A JP 10294967 A	28/10/98 04/11/98
DE 19616150 A1	27/11/97	NONE	
EP 0948222 A2	06/10/99	NONE	
WO 9411849 A1	26/05/94	AT 159602 T DE 69314804 D,T EP 0669031 A,B ES 2107689 T FI 925135 A FI 934995 A GR 3025393 T NO 951814 A	15/11/97 12/02/98 30/08/95 01/12/97 12/05/94 12/05/94 27/02/98 09/05/95

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 8M22PC	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/FI99/01054	International filing date (day/month/year) 17/12/1999	Priority date (day/month/year) 11/01/1999
International Patent Classification (IPC) or national classification and IPC H04Q7/22		
Applicant TELEFONAKTIEBOLAGET LM ERICSSON (publ) et al.		



1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

 These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 04/08/2000	Date of completion of this report 23.04.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Veaux, C  Telephone No. +49 89 2399 8820

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/FI99/01054

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-6 as originally filed

Claims, No.:

1-6 as originally filed

Drawings, sheets:

1/2-2/2 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/FI99/01054

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-6
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-6
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-6
	No:	Claims	

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/FI99/01054

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement

Document D1=EP-A-874529, cited in the international search report, is considered as the nearest available prior art document relating to the claimed subject-matter.

Document D1 relates to a mobile information device which can obtain local information associated with a local area where it is located and perform a function based on the obtained information and therefore relates, as the present application, to the use of mobile terminals in the provision of local wireless services.

It discloses, in accordance with the features of claim 1, a method of interworking between a mobile terminal and a local service in which information is conveyed between the local service and the mobile terminal over a local wireless communication channel, the method comprising broadcasting from the local service, over the wireless communication channel, service notification messages and conducting a mobile terminal identification process between a terminal and the local service over the wireless communication system.

D1 however does not disclose that the claimed identification process only takes place if the mobile terminal is present within a localised region which is a sub-region of the region over which said service notification messages are broadcast.

This feature allows unambiguous identification of a particular service a user wishes to take advantage of when several local systems offering a variety of product and services are in close proximity to one another and the radio coverage provided by the systems overlap.

It is neither disclosed in or rendered obvious by the available prior art documents, and independent claim 1 thus fulfils the requirements of Articles 33(2) and (3) PCT.

Independent claims 4 and 6 define an apparatus and local service in corresponding terms and therefore also fulfil the requirements of Articles 33(2) and (3) PCT.

Claims 2, 3 and 5 are dependent on claims 1 or 4 and therefore also fulfil the requirements of Article 33(2) and (3) PCT.

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/FI99/01054

VII. Certain defects in the international application

Document D1=EP-A-874529 is not identified in the description (Rule 5.1(a)(ii) PCT).

The independent claims are not cast in the two-part form, with a preamble containing the features known from D1 (Rule 6.3 PCT)

The same consideration applies to independent claims 4 and 6, which should also be draft in the two-part form.

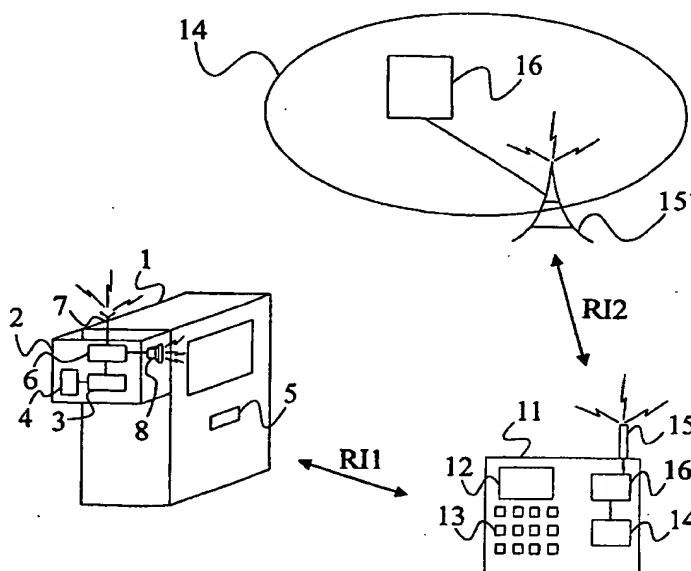
No reference signs in parentheses have been inserted in the claims to increase their intelligibility (Rule 6.2(b) PCT).



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 : H04Q 7/22, 7/38, G07F 9/00	A1	(11) International Publication Number: WO 00/42787 (43) International Publication Date: 20 July 2000 (20.07.00)
(21) International Application Number: PCT/FI99/01054 (22) International Filing Date: 17 December 1999 (17.12.99) (30) Priority Data: 990037 11 January 1999 (11.01.99) FI (71) Applicant (for all designated States except US): TELEFON-AKTIEBOLAGET LM ERICSSON (publ) [SE/SE]; S-126 25 Stockholm (SE). (72) Inventor; and (75) Inventor/Applicant (for US only): AHONEN, Pasi, Matti, Kalevi [FI/FI]; Sienikatu 9 E, FIN-04200 Kerava (FI). (74) Agent: BORENIUS & CO OY AB; Kansakoulukuja 3, FIN-00100 Helsinki (FI).	(81) Designated States: AE, AL, AM, AT, AT (Utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), DM, EE, EE (Utility model), ES, FI, FI (Utility model), GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.	

(54) Title: LOCAL WIRELESS SERVICES



(57) Abstract

A method of interworking between a mobile telephone (11) and a local service (1) in which information is conveyed between the local service (1) and the mobile telephone (11) over a local wireless communication channel (RI1). Service Notification messages are broadcast from the local service (1), over the wireless communication channel, to listening mobile telephones (11). An identification process is conducted between the mobile telephone (11) and the local service (1) over the wireless communication channel, the process only proceeding if the mobile telephone (11) is present within a localised region (10) which is a sub-region of the region (9) over which the service notification messages are broadcast.

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Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

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Local Wireless Services

Field of the Invention

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The present invention relates to local wireless services and more particularly to the use of mobile terminals in the provision of local wireless services.

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Background to the Invention

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With the increasing use of mobile telephones, proposals have been made to make use of mobile telephones to control and interact wirelessly with local systems. For example, JP 8249530 describes the use of a mobile telephone to purchase goods from a vending machine by sending a radio signal directly to the vending machine or alternatively by placing a call to the vending machine over a telephone circuit. The cost of a purchased article or service is charged to the telephone subscriber's telephone account. Similarly, the use of mobile telephones to purchase such things as train and airline tickets, as well as to remotely operate televisions, stereos, etc, can be envisaged.

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Consumer take-up of products offering this type of functionality will depend to a large extent upon the inter-operability of the products. The same applies to take-up by manufacturers. As such, the definition of some appropriate industry-wide standard for the radio interface between mobile terminals and local systems, e.g. vending machines, televisions, etc, is almost essential. A number of major electronics companies are currently working together in a project named "Blue Tooth" with the aim of providing such a standard.

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Whilst the provision of a standard in this area will theoretically facilitate the interworking of mobile terminals with multiple local systems, a number of practical problems remain to be overcome.

Summary of the Present Invention

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One such problem has been recognised by the inventor of the present invention. In relatively congested areas such as shopping centres, airports, railway stations etc, it is likely that several local systems offering a variety of products and services will be in close proximity to one another. A consequence of this is that the radio coverage provided by the systems will overlap. Whilst this does not necessarily represent a technical problem (the use of appropriate signalling technology will avoid cross-system interference), it may present a problem to the user of a mobile terminal who is likely to receive simultaneously several different and possibly competing messages and/or advertisements. A particular problem is that if the user wishes to take advantage of one particular service, he may not be certain with which service he is interacting.

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It is an object of the present invention to overcome or at least mitigate the above noted disadvantages. This and other objects are achieved at least in part by facilitating interactive communication between a mobile terminal and a local service, or at least a critical part of said communication therebetween, only when the mobile terminal is positioned within a relatively small localised region.

According to a first aspect of the present invention there is provided a method of interworking between a mobile terminal and a local service in which information is conveyed between the local service and the mobile terminal over a local wireless communication channel, the method comprising:

broadcasting from the local service, over the wireless communication channel, service notification messages; and

conducting a mobile terminal identification process between a mobile terminal and the local service over the wireless communication channel, said process only proceeding if the mobile terminal is present within a localised region which is a sub-region of the region over which said service notification messages are broadcast.

Embodiments of the present invention enable different local services in the same vicinity to have respective "identification" regions, which may be spots, sectors, or the like. These identification regions may be distinguished on the floor with different colours, text, etc.

It will be understood that the term "local system" is used here to define a system which is capable of communicating with mobile terminals located in relatively close proximity to the system, e.g. within a range of 100 metres, 10 metres, or the like. The local service is typically a service provider or product dispenser.

Preferably, the mobile terminal is a cellular radio telephone or smart phone which communicates with a cellular radio network using a communications protocol, e.g. GSM, distinct from the protocol used over said local communication channel.

Whilst the service notification messages may be broadcast from the local service via a traditional broadcast antenna (where the wireless communication channel is a radio channel), the identification phase may be carried out using a directional antenna or receiver provided at the local service.

According to a second aspect of the present invention there is provided apparatus for interworking between a mobile terminal and a local service in which information is conveyed between the local service and the mobile terminal over a local wireless communication channel, the apparatus comprising:

a local system having transmitting means for broadcasting from the local service, over the wireless communication channel, service notification messages; and

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at least one mobile terminal arranged in use to conduct an identification process with the local service over the wireless communication channel, said process only proceeding if the mobile terminal is present within a localised region which is a sub-region of the region over which said service notification messages are broadcast.

Preferably, the wireless communication channel is a radio channel, and the local system comprises a directional radio transmitter or receiver whose transmission/reception area defines said localised region.

According to a third aspect of the present invention there is provided a local service for interworking with a mobile terminal wherein information is conveyed between the local service and the mobile terminal over a local wireless communication channel, the local service comprising:

transmitting means for broadcasting, over the wireless communication channel, service notification messages;

a directional transmitter or receiver for defining a localised transmission/reception region which is a sub-region of the region over which said service notification messages are broadcast; and

processing means for conducting an identification process with a mobile terminal over the wireless communication channel and using said directional transmitter or receiver, said process only proceeding if the mobile terminal is present within the localised region.

Brief Description of the Drawings

For a better understanding of the present invention and in order to show how the same may be carried into effect reference will now be made, by way of example, to the accompanying drawings, in which:

Figure 1 shows schematically a vending machine and a mobile terminal which are able to interact with one another in accordance with an embodiment of the invention;

Figure 2 illustrates the radiation patterns produced by a broadcasting antenna and a directional antenna of the vending machine of Figure 1; and

Figure 3 is a flow diagram illustrating the method of operation of the system of Figure 1.

Detailed Description of Certain Embodiments

There is illustrated in Figure 1 a vending machine 1 which is one example of a local system in which the present invention may be employed. Articles which may be purchased from the vending machine include the likes of soft drinks, chocolate bars, etc. The vending machine has a control unit 2 which comprises a central processing unit 3 as well as a memory device 4 which stores control instructions for the central processing unit 3 as well as other data. The control unit 2 is electrically connected to the mechanical selection and outlet mechanism of the vending machine

1 such that the control unit can cause specific items to be dispensed to a consumer via an outlet tray 5 of the vending machine 1.

4 The control unit 2 also comprises a radio frequency transceiver 6 which is coupled on the one side to the central processing unit 3 via appropriate interface circuitry (not shown in the Figure) and on the other side to a transmitting and receiving broadcast antenna 7. The transceiver 6, antenna 7, and central processing unit 3 are arranged to communicate with mobile terminals such as mobile
8 telephones via a standardised local radio air interface protocol R11. The range over which such communications may be carried out is relatively small, e.g. of the order of 10 metres.

The control unit 2 further comprises a directional transmitting and receiving antenna 8 coupled to
12 the transceiver 6. The directional antenna 8 may be for example a mechanical slot type antenna. The control unit 2 is arranged to switch between the broadcast antenna 7 and the directional antenna 8 depending upon the particular transmission requirements. Figure 2 illustrates a plan view of the transmission/reception radiation patterns which may be produced by the two antennae
16 7,8, where the broadcast antenna 7 produces a generally circular pattern 9 and the directional antenna 8 produces a pattern 10 covering a restricted sector (shown cross-hatched) of the broadcast pattern. It will be appreciated that the radiation pattern produced by the directional antenna 8 will in practice deviate from the sector illustrated, e.g. having a lobe shape, and will
20 encompass a 3-dimensional region of space.

Figure 1 illustrates a typical mobile telephone 11 which may be thought of as a "smart phone". The telephone 11 comprises a display 12 and a keyboard 13, as well as a central processing unit
24 (or digital signal processor) 14. An antenna 15 and transceiver 16 of the telephone 11 enable the telephone to communicate in the normal way with a cellular telephone network 14, e.g. using the GSM protocol R12, having a number of Base Station Subsystems 15 and a Mobile Switching Centre 16. However, the central processing unit 14 is additionally able to communicate with the
28 control unit 2 of the vending machine 1 using the previously mentioned standardised local air interface. The same antenna 15 and transceiver 16 may be used for such local communications although another antenna and transceiver may be required. As the telephone 11 is able to communicate using two different protocols, it may be considered a "dual-mode" telephone.

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In use, the control unit 2 is arranged to broadcast at regular intervals a Service Notification message over its 10 metres broadcast range using the broadcast antenna 7. Mobile terminals such as the telephone 11 are programmed to listen for such Terminal Alert messages and, upon receipt,
36 to alert the telephone user that the telephone is within the coverage range of a local system to which the user has access. The Service Notification message will typically contain additional information describing the service which the broadcasting system offers. This may be displayed as text or an icon on the display 12 of the telephone 11.

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The Service Notification message contains additional data which, in the event that the user responds to an "Accept Service?" prompt, causes the following message to be displayed on the

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telephone's display 12: "Please move into the red circle and press *". Figure 2 illustrates an example "red" circle 17 (shown shaded in the Figure) which may be painted on the floor in front of the vending machine.

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The central processing unit 3 of the vending machine's control unit 2 then switches the output and input of the transceiver 6 from the broadcast antenna 7 to the directional antenna 8. Assuming that the user of the mobile telephone 11 enters the red circle 17, he enters within the transmission/reception area 10 of the directional antenna 8. By pressing "*", the user causes the mobile terminal 11 to transmit an Identification message which is received by the directional antenna 8. The Identification message contains, for example, the user's telephone number which uniquely identifies the telephone 11. It is noted that, in the event that the user presses "*" whilst outside the sector 10, the transmitted Identification message is not received by the vending machine 1 and the process is eventually timed-out.

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Upon receipt of the Identification message at the vending machine 1, the central processing unit 3 of the control unit 2 initiates a telephone call to the operator of the cellular network 14 to which the mobile telephone 11 subscribes, either via a fixed line connection or via the cellular network. The identity of the operator, or a telephone number of the operator, may be returned to the control unit 2 in the Identification message. This telephone call is used by the control unit 2 to verify the identity of the mobile telephone 11 and to establish a billing relationship.

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When the identity of the telephone 11 has been authenticated by the vending machine 1, the vending machine 1 initiates a transaction phase with the mobile telephone 11. This will not be described in detail here but could include, for example, the selection at the mobile telephone 11 of an article to be purchased, from a list of possible articles transmitted to the telephone 11 from the vending machine 1. The transaction phase may be conducted using either the broadcast antenna 7 or the directional antenna 8, as the interworking relationship between the telephone 11 and the vending machine 1 is now established.

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Upon receipt of a Purchase message, the central processing unit 3 of the control unit 2 instructs the vending machine to select and dispense the article identified in the Purchase message. The central processing unit 3 then redials the number of the network operator (if the previous authentication connection has been terminated) and transmits an instruction to the operator to debit the transaction cost from the telephone user's account and to credit it to an account held by the operator of the vending machine 1. It will be appreciated that other charging schemes may be used. For example, the cellular network operator may act as an electronic bank for the subscriber, holding a deposit of electronic money. Electronic money is transferred to the vending machine operator (or his bank) upon completion of the transaction.

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Figure 3 is a flow diagram illustrating the interworking procedure described above.

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It will be appreciated by the person of skill in the art that other modifications may be made to the above described embodiment without departing from the scope of the present invention. For example, the local radio link (RI1) which couples the telephone 11 to the vending machine 1 may be replaced with an infra-red or ultra-sonic link.

As an alternative to using a directional antenna 8, the location of a transmitting mobile telephone may be determined by using an array of antennae at the vending machine 1. By using at least three receiving antennae and by measuring the relative propagation delays for a signal (codeword) transmitted from the mobile telephone, it is possible to verify that the telephone is within a predefined region. As a further alternative, radio signal may be directed to (and/or from) a predefined region using a waveguide or pipe for the purpose of verifying the location of a mobile telephone.

Claims

1. A method of interworking between a mobile terminal and a local service in which information is conveyed between the local service and the mobile terminal over a local wireless communication channel, the method comprising:

broadcasting from the local service, over the wireless communication channel, service notification messages; and

conducting a mobile terminal identification process between a mobile terminal and the local service over the wireless communication channel, said process only proceeding if the mobile terminal is present within a localised region which is a sub-region of the region over which said service notification messages are broadcast.

2. A method according to claim 1, wherein the mobile terminal is a cellular radio telephone or smart phone which communicates with a cellular radio network using a communications protocol distinct from the protocol used over said local communication channel.

3. A method according to claim 1 or 2, wherein the service notification messages are broadcast from the local service via a broadcast antenna and the identification phase is carried out using a directional antenna or receiver provided at the local service.

4. Apparatus for interworking between a mobile terminal and a local service in which information is conveyed between the local service and the mobile terminal over a local wireless communication channel, the apparatus comprising:

a local system having transmitting means for broadcasting from the local service, over the wireless communication channel, service notification messages; and

at least one mobile terminal arranged in use to conduct an identification process with the local service over the wireless communication channel, said process only proceeding if the mobile terminal is present within a localised region which is a sub-region of the region over which said service notification messages are broadcast.

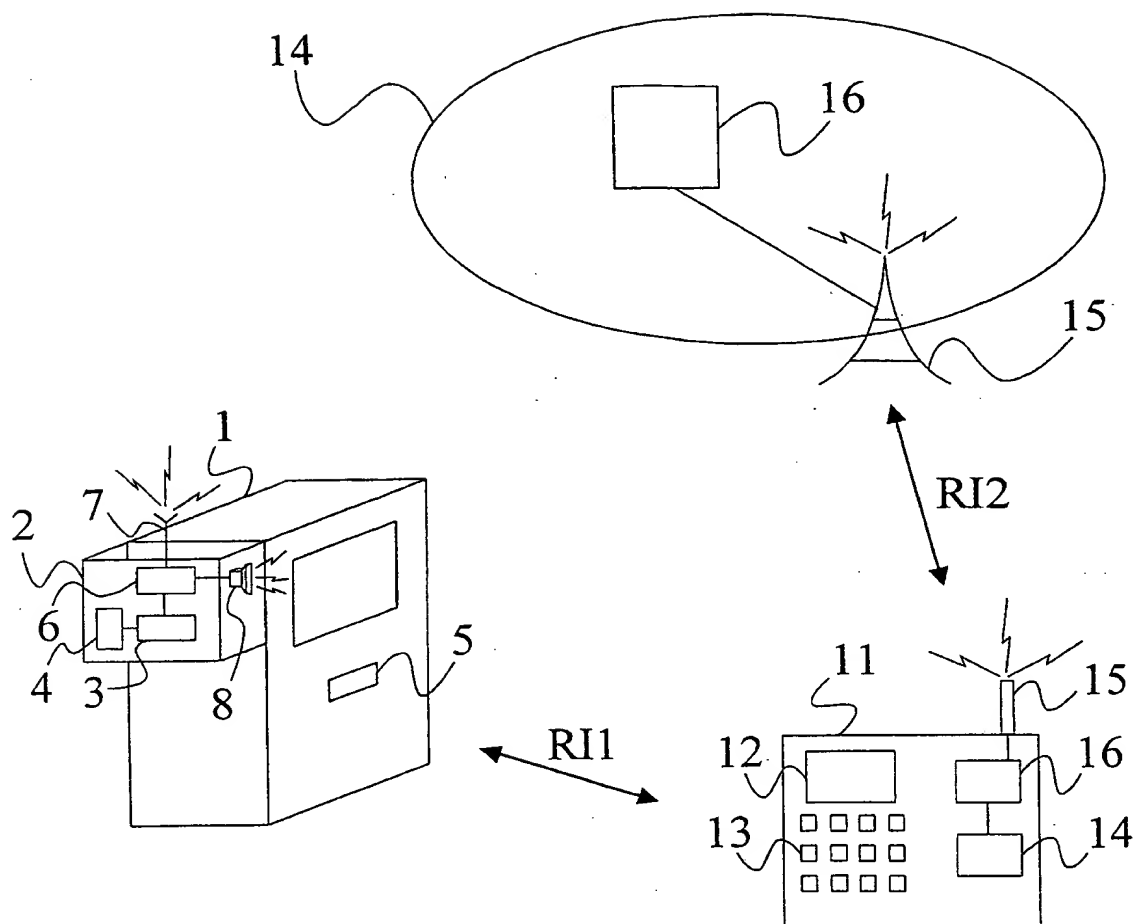
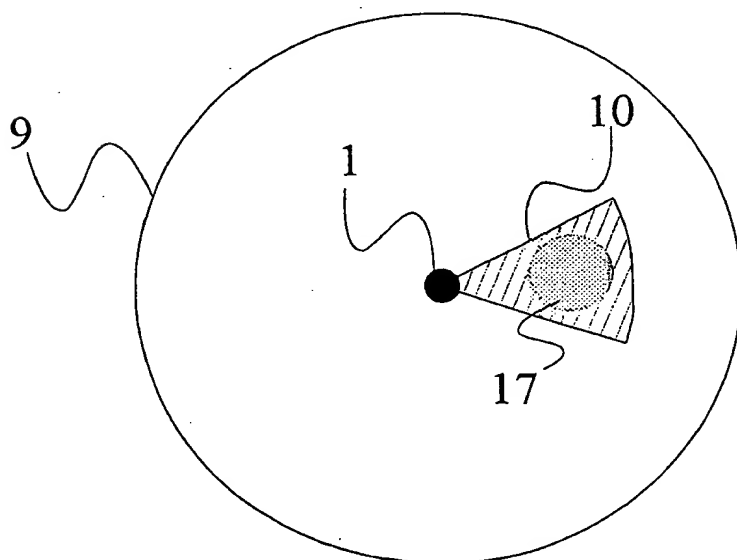
5. Apparatus according to claim 4, wherein the wireless communication channel is a radio channel, and the local system comprises a directional radio transmitter or receiver whose transmission/reception area defines said localised region.

6. A local service for interworking with a mobile terminal wherein information is conveyed between the local service and the mobile terminal over a local wireless communication channel, the local service comprising:

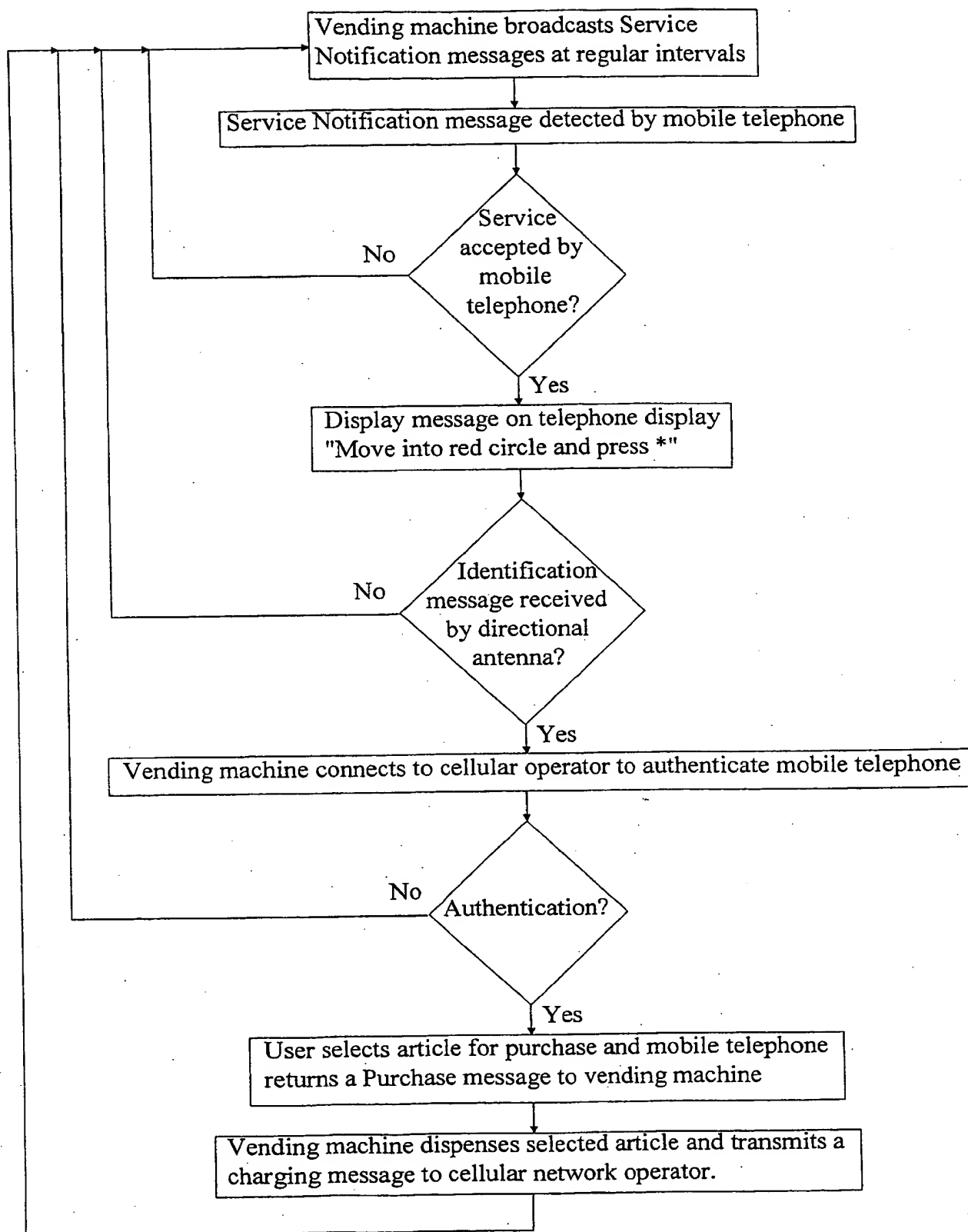
transmitting means for broadcasting, over the wireless communication channel, service notification messages;

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a directional transmitter or receiver for defining a localised transmission/reception region which is a sub-region of the region over which said service notification messages are broadcast; and
processing means for conducting an identification process with a mobile terminal over the wireless communication channel and using said directional transmitter or receiver, said process only proceeding if the mobile terminal is present within the localised region.

Figure 1Figure 2

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Figure 3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 99/01054

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04Q 7/22, H04Q 7/38, G07F 9/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: G07F, H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0874529 A2 (CASIO COMPUTER CO., LTD.), 28 October 1998 (28.10.98), column 4, line 55 - column 7, line 12 --	1-6
A	DE 19616150 A1 (DST DEUTSCHE SYSTEM-TECHNIK GMBH), 27 November 1997 (27.11.97), column 3, line 66 - column 4, line 6, figures 1,2,3 --	1-6
P,A	EP 0948222 A2 (INTERNATIONAL BUSINESS MACHINES CORPORATION), 6 October 1999 (06.10.99), column 12, line 22 - column 13, line 53 --	1-6

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 99/01054

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>WO 9411849 A1 (VATANEN, HARRI, TAPANI), 26 May 1994 (26.05.94), see whole document</p> <p style="text-align: center;">-- -----</p>	1-6

INTERNATIONAL SEARCH REPORT
Information on patent family members

02/12/99

International application No.
PCT/FI 99/01054

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EP 0948222 A2	06/10/99	NONE	
WO 9411849 A1	26/05/94	AT 159602 T DE 69314804 D,T EP 0669031 A,B ES 2107689 T FI 925135 A FI 934995 A GR 3025393 T NO 951814 A	15/11/97 12/02/98 30/08/95 01/12/97 12/05/94 12/05/94 27/02/98 09/05/95